



► Technical Brief

March 2026

Rainwater harvesting units in Jordan: Assessment of effects



Key points

- **Enhanced agricultural productivity and efficiency:** The construction of 262 rainwater harvesting units across eight governorates significantly improved agricultural efficiency for smallholder farmers. Approximately, 91 per cent of beneficiaries reported reductions in irrigation costs, with a majority achieving cost savings between 20 per cent and 60 per cent. Also, 79 per cent observed improved land productivity, and 73 per cent reported increased farm revenues. The adoption of water harvesting practices enabled better crop diversification, with 59 per cent of farmers introducing new crop varieties and 51 per cent investing in improved irrigation technologies.
- **Socioeconomic and gender-inclusive effects:** The intervention facilitated tangible socio-economic gains. A third of the farmers hired additional labour, creating over 2,000 workdays within a single season. The project notably contributed to gender inclusion, with 55 per cent of farmers' wives participating in farm operations, primarily in irrigation and harvesting tasks. These outcomes underscore the project's broader role in promoting inclusive rural development and labour force engagement, especially among women.
- **Sustainability through community adoption and innovation:** The initiative demonstrated strong diffusion effects, with 46 per cent of participating farmers influencing neighbouring households to replicate the intervention. This led to the construction of an estimated 266 additional units. The water harvesting systems served primarily irrigation needs, even during dry seasons, often supplemented by municipal sources, thus illustrating adaptability and sustained usage patterns under climatic stress.
- **Challenges in infrastructure and financial support:** Despite positive outcomes, structural and financial barriers persisted. Approximately 28 per cent of farmers conducted maintenance on their units, citing high costs and technical constraints. Leakage in some units further highlighted the necessity of improved soil assessment and construction protocols. Farmers also advocated for increased grant sizes and flexibility in constructing multiple units to address diverse farm-scale needs.
- **Critical lessons and pathways forward:** The study emphasizes the need for enhanced technical support, maintenance frameworks, and gender-responsive design. It also recommends strengthening peer-to-peer learning and community-based knowledge transfer to amplify impact. Integrating these insights into the next phase of Employment-Intensive Infrastructure programming under PROSPECTS could substantially improve sustainability, scalability, and long-term developmental outcomes.

► Background

Water scarcity remains a significant challenge in Jordan, particularly for smallholder farmers who depend on agriculture for their livelihoods. To address this issue, the International Labour Organization (ILO), in collaboration with the Ministry of Agriculture (MOA) and with funding from the Kingdom of Norway, provided water harvesting support to farmers. Under the ILO project titled 'Job creation for Syrian refugees and Jordanian host communities through green works in agriculture and forestry' (2016–19), rainwater harvesting units were constructed across eight governorates. The initiative aimed to enhance agricultural productivity, reduce irrigation costs, create short-term employment opportunities, and improve the socio-economic conditions of Syrian refugees and Jordanian host communities. This assessment evaluates the long-term effects of these interventions.

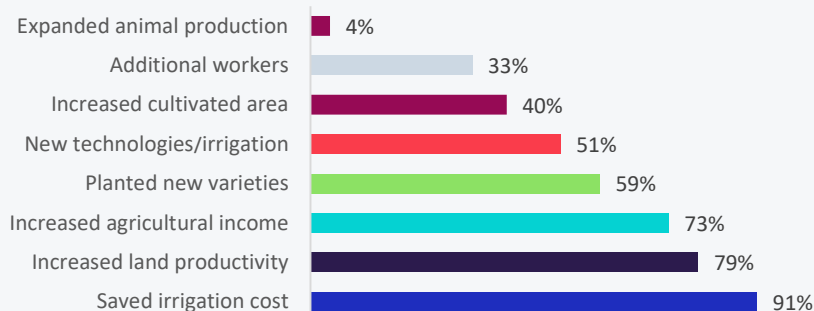
This joint assessment, conducted in collaboration with the EMPINVEST Branch, falls under the PROSPECTS Partnership established by the Government of the Netherlands in 2019. This partnership brings together five partner organizations – IFC, UNICEF, ILO, UNHCR and the World Bank – to tackle challenges impacting the livelihoods and well-being of Jordanians, refugees and other vulnerable groups in three key areas: education, employment, and protection. The findings from this assessment will guide the design of the Employment-Intensive Infrastructure interventions in the second phase of PROSPECTS.

Project overview

The project was executed in two phases. Phase 1 was implemented between 2016 and 2018 where 143 cisterns were constructed in the governorates of Ajloun, Jerash, Balqa, Karak, and Tafila. Phase 2 was implemented between 2017 and 2019 supporting an additional 119 units in the governorates of Madaba, Zarqa, Karak and Ma'an. Farmers received a post-construction grant of JOD 1,200 per unit, with most investing additional funds to complete construction. The units, primarily cisterns and tanks, were designed to improve rainwater harvesting and storage for supplementary irrigation purposes during the dry season.

The purpose of this study is to (i) assess the effects of constructing rainwater harvesting units for smallholder farmers in Jordan, on the farm production, the farmers and their families, and (ii) explore the success factors in a systematic and replicable manner. Thus, the research design attempted to reach all beneficiaries supported under the water harvesting component of the project: 'Job creation for Syrian refugees and Jordanian host communities through green works in agriculture and forestry'. The field work took place between 5–16 December 2024, using Computer Assisted Personal Interviews (CAPI) that were administered face-to-face. Prior to the field work, the enumerators were trained in both a classroom setting and in the field. Following the data collection, interviews with MOA staff took place, in addition to a lessons learnt session.

► **Figure 1: Benefits and changes reported by the farmers following the construction of the water harvesting unit (Share, N=169)**



Objective	Target	Methodology	Fieldwork
(i) To assess the effects of constructing rainwater harvesting units for smallholder farmers in Jordan, on the farm production, the farmers and their families, (ii) To explore the success factors in a systematic and replicable manner	The full population of 262 units	• Computer Assisted Personal Interviews (CAPI) – conducted face-to-face • Training of enumerators • Field work – analysis • Interviews with key partner – MOA • Lessons learnt session	5–16 December 2024

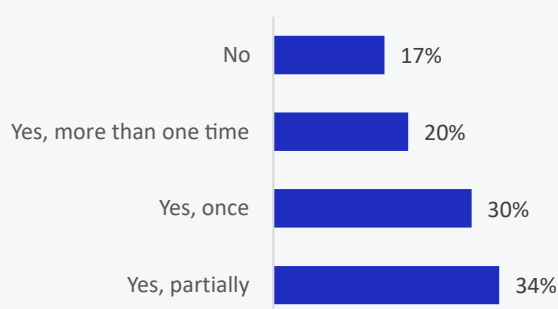
Project impacts (key findings)

The units constructed during the first phase of the project were assessed in 2019. The assessment back then targeted 143 water harvesting units in the governorates of Ajloun, Jerash, Balqa, Karak, and Tafilah. This assessment confirmed the findings of the previous assessment, including several benefits reported by the farmers on increases in plant variety, saving in irrigation water costs, increased outcome and investments made by investments in infrastructure. The key findings of this assessment include:

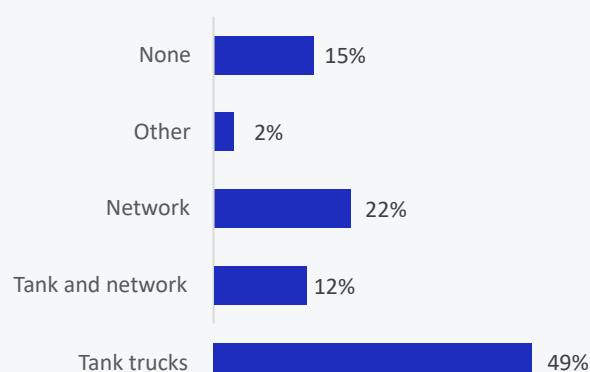
- **About three quarters of the water harvesting units are still in use.** Although a small share of these units is used for domestic purposes only, about 65 per cent of the units supported by the project are in part or in full used for farming activities.
- **The implementation of water harvesting units has resulted in significant improvements in agricultural efficiency and productivity.** A total of 91 per cent of farmers reported reduced irrigation costs, with 60 per cent achieving savings between 20 per cent and 60 per cent. Additionally, 79 per cent

of farmers observed increased land productivity, leading to improved crop yields. The project also contributed to higher agricultural income, with 73 per cent of farmers experiencing growth in farm revenues. Furthermore, 59 per cent of farmers introduced new crop varieties, and 51 per cent invested in modern irrigation systems, reflecting the project's role in promoting crop diversification and technological adoption. Given that the last winter (2023) was relatively dry, combined with the farmers reporting on rainwater collection, it seems that the water harvesting units were mostly used for irrigation water storage including from other sources, mainly, the water network and water trucks. These findings highlight the project's effectiveness in enhancing agricultural sustainability and economic resilience for smallholder farmers. It also indicates the need to explore pathways to enhance rainwater harvesting, sustainability and economic resilience for smallholder farmers. It also indicates the need to explore pathways to enhance rainwater harvesting.

► Figure 2: Unit collected water last winter



► Figure 3: Used other sources to fill the unit



► **The implementation of rainwater harvesting units has yielded significant economic and social benefits for smallholder farmers in Jordan.**

Employment opportunities expanded, with 33 per cent of farmers hiring additional labour, generating a total of 2,045 workdays in a single agricultural season. Gender inclusion was also enhanced, as 55 per cent of farmers' wives actively participated in farming activities, primarily in irrigation and harvesting, contributing to household agricultural productivity. Furthermore, the project facilitated dynamic community expansion, with 46 per cent of beneficiaries influencing neighbouring farmers to adopt similar practices, resulting in the independent construction of 266 additional water harvesting units. These findings highlight the project's role in fostering local economic growth, promoting gender-responsive agricultural practices, and encouraging sustainable water management within farming communities.

► **The farmers encountered several challenges that affected its overall effects of the units.** Some water harvesting units experienced leakage issues, highlighting the need for enhanced construction techniques and soil testing. Financial constraints limited the ability of many farmers to maintain their units, with only 28 per cent performing necessary upkeep. Farmers also expressed concerns about the grant value, suggesting that increased funding and the ability to construct multiple units per farm would better support their needs. Additionally, there was a notable gap in technical guidance for some farmers, a key project element they valued highly. Addressing these challenges will be critical to ensuring the long-term success and sustainability of similar initiatives.

Lessons

Multiple lessons were defined based on the findings of the assessment and the conversations with the Ministry of Agriculture. These lessons include:

- **The importance of the technical support component to the farmers.** Farmers require ongoing technical guidance to ensure proper construction and maintenance of water harvesting units. Providing detailed construction specifications and training to farmers and contractors can help prevent issues like leakage and structural weaknesses.
- **Financial constraints limit effectiveness.** While the grant of JOD 1,200 was beneficial, many farmers had to invest additional funds to complete their units. Increasing financial support or providing flexible additional funding options could enhance project effectiveness and farmer participation.

- **Need for maintenance assistance:** Only 28 per cent of farmers performed maintenance, mainly due to financial and technical constraints. Future projects should consider incorporating maintenance training and financial incentives to ensure long-term functionality.
- **Encouraging community adoption:** The project's success influenced neighbouring farmers to construct 266 additional water harvesting units of their own. This demonstrates the potential for knowledge-sharing and peer learning, which should be leveraged in future initiatives.
- **Gender inclusion enhances agricultural productivity:** The significant involvement of farmers' wives in farming activities highlights the need for gender-responsive interventions. Providing targeted support to female farmers can further improve agricultural productivity and household income.
- **Employment creation strengthens rural economies:** The project facilitated job creation, generating over 2,000 workdays in one season. Expanding such initiatives can provide sustainable employment opportunities in rural areas.
- **Tailoring solutions to regional needs:** Variations in irrigation cost savings and land productivity across regions suggest that localized solutions and region-specific strategies should be considered to maximize impact.



Key actions (Recommendations)

To maximize the benefits of rainwater harvesting, the following measures are recommended:



Enhance technical support and training including through leveraging community expansion and peer learning: Provide farmers and contractors with comprehensive construction guidelines, training workshops and knowledge sharing sessions with other farmers.



Increase grant value and improve maintenance: Allow for larger storage units and additional funding for maintenance.



Strengthen monitoring and evaluation: Establish long-term tracking mechanisms to measure continued impact including collection some baseline data during project implementation.



Promote additional water storage solutions: Introduce subsidized options like PVC or metal storage units.



Facilitate access to agricultural innovations: Support investments in modern irrigation techniques, solar-powered pumps, and sustainable farming practices.



Support gender inclusion: through targeted support to female farmers and engagement of women in the household, in farm-level assistance. Provide basic labour rights, safe working conditions and occupational safety guidelines and awareness sessions to farmers hiring or planning to hire workers.

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